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tive value was 100%). This may help to plan cross-clamp strategies in a attempt to further decrease the incidence of postoperative spinal cord complications in the near future. Furthermore, it can be of additional value in cases in which endovascular treatment attempts to cover the entire descending thoracic aorta, including the SA supplying the AKA. In these cases, caution for spinal cord ischemia is justified, and protective measures are warranted.

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AUTHOR CONTRIBUTIONS

Conception and design: RJN, MJJ, JMAvE, WHB
Analysis and interpretation: RJN, MJJ, GWS, AGHK, JMAvE, WHB
Data collection: RJN, MJJ, GWS
Writing the article: RJN, MJJ, GWS, AGHK, JMAvE, WHB
Critical revision of the article: RJN, MJJ, GWS, AGHK, JMAvE, WHB
Final approval of the article: RJN, MJJ, GWS, AGHK, JMAvE, WHB
Statistical analysis: RJN, AGHK, WHB
Obtained funding: RJN, MJJ, JMAvE, WHB
Overall responsibility: MJJ

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DISCUSSION

Dr Kenneth Cherry *(Charlottesville, Va)*. If I were to do your technique and see several arteries going in that direction, how would I know which is the artery of Adamkiewicz? How do you differentiate that from other arteries so that you identify it 100% of the time? Is there ever confusion?

Dr Nijenhuis. Indeed you correctly mention that apart from the Adamkiewicz artery there can be additional anterior radiculomedullary arteries supplying the thoracolumbar spinal cord. However, the Adamkiewicz artery is the largest anterior radiculomedullary artery. Thus, if more enhancing vessels were observed in the first-phase MR angiography images that originated from an intervertebral foramen between T8 and L2 and continued towards the midline vessel on the anterior spinal cord surface, the one with the largest (ie, thickest) diameter was considered to represent the Adamkiewicz, and arteries of smaller diameter (ie, thinner) were considered to be other anterior radiculomedullary arteries.

Dr Richard Cambria *(Boston, Mass)*. My question is an anatomic one. You've got very detailed imaging on these patients, and is there any correlation with the CT [computed tomographic] scan appearance? Those of us who don't use things like motor-evoked potential will look at the CT scan and say there is a lot of thrombus in the T9 to L1 segment; we're home free, and we're not going to have to fiddle with any of those intercostals. So can you correlate the CT thrombus appearance with your ability to demonstrate direct or indirect supply to the Adamkiewicz artery?

Dr Nijenhuis. We also perform CT angiography in all these patients. At present, we are evaluating our CT angiography results with respect to the localization of the Adamkiewicz artery. Therefore, I am unable to comment on this matter and its relation to aortic thrombus. However, our preliminary experience is that because of the obesity of the patients and the fact that CT angiography is a transmission technique, localization of the Adamkiewicz artery is more difficult with CT angiography compared with MR angiography.

Dr Jan Brunkwall *(Bonn, Germany)*. I have a question regarding your decision making. When you decided to reattach the intercostal arteries, did you rely solely on the MEPs or did you rely on the MR findings, or was it a combination of the two?

Dr Nijenhuis. Revascularization is initiated on the basis of the result of the MEPs. The goal of preoperative localization of the segmental artery supplying the Adamkiewicz artery by MR angiography is to enable selective and targeted revascularization of this supply in case MEPs drop.

However, also when MEPs remain stable, we preventively reattach the segmental artery supplying the Adamkiewicz artery whenever possible, which is again guided by the preoperative MR angiography.

Dr Peter Gloviczki *(Rochester, Minn)*. I think it is excellent to have a noninvasive tool available that tells us about the anatomy of the spinal cord.

My question is, have you used this technique postoperatively to follow up the patency of your spinal cord reconstruction? Sometimes my impression is that some of the reconstructions we do may not work in the long run, so I'm wondering if you have a follow-up.

And my second question is, have you tried the new-generation CT angiograms? We have used them effectively to visualize the artery of Adamkiewicz, and I'm wondering which one is your preference.

Dr Nijenhuis. Regarding your first question, we perform postoperative MR angiography for the following reasons: the first is, as you mentioned, to follow up the patency of the revascularization; the second one is to investigate the development of the collateral system.

Regarding your CT angiography question, at this moment we have only a 4-slice CT scanner, so we have no experience with the new-generation 64-slice scanners. However, we are not yet convinced that these 64-slice scanners will improve the results of the 4-slice scanners. The 64-slice scanner can improve the spatial resolution as well as the scan time; however, they do not improve the necessary absorption to increase the visibility of the Adamkiewicz artery. So, because of the obesity of our patient population, our preference is to use MR angiography.

Dr Wilhelm Sandmann *(Dusseldorf, Germany)*. The goal of any surgeon who replaces the thoracoabdominal aorta is to know where the blood supply to the spinal cord comes from. In my experience, however, I saw, probably in one third of over 800 patients, more than half of the intercostal arteries occluded, including those from which the major radicular artery might originate. So I have difficulties to understand how you could prove in 100% of your cases where this particular artery arises from. We have patients where almost all intercostal arteries were occluded and the blood supply could come from the hypogastric arteries. The latter could be proven in two patients using sensory evoked potentials recorded directly from the spinal cord. So with your method, were you able to show other blood supplies than the Adamkiewicz artery feeding the spinal cord? This could be interesting for implantation during surgery as well.

Dr Nijenhuis. The level of the origination of the Adamkiewicz artery is fixed; however, the segmental supply to the Adamkiewicz artery may vary, as we have shown. In 24 patients the segmental artery at the level and side of the Adamkiewicz was occluded at its origin in the aortic wall. In these cases this partially occluded segmental artery was supplied by intersegmental collaterals that originated from the hypogastric artery or from a nearby segmental artery one or two levels above or below the level of the Adamkiewicz artery. We labeled a segmental artery as being the supplier of the Adamkiewicz artery only if this segmental artery had an open and direct connection with the aorta. Therefore, we cannot exclude that other segmental arteries contribute as well.